



*Examination & Local Treatment
of the
Larynx.*

*Walker Lyon M. B.
Houghton-le-Spring
March 20th 1875.*

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Various attempts to examine the interior of the larynx were made in the beginning of the present Century & even in the preceding one, but it was not till 1858 that a workable instrument for the purpose was given to the world by Czermak of Prag. Since that time the subject has been taken up on all hands & the laryngoscope now takes its place as one of our recognised surgical instruments. The instrument consists of a mirror for holding in the cavity of the pharynx, & an apparatus for throwing the light on the mirror. The laryngeal mirror has been made of various shapes & of various materials but the circular glass plate silvered at the back is now almost universally used. For most purposes a mirror four-fifths of an inch in diameter & set on a handle at an angle of about 120° is the most convenient. For throwing the light on the laryngeal ~~ap.~~ parts mirror a greater variety of apparatus has been & still is used. Direct light has been found so inconvenient that it may be left out of account, & we have only to consider the various

means of applying reflected light.

The reflector, made of silvered glass like the mirror, is generally from 3 to 4 inches in diameter with a circular or oval opening in the centre, plane if intended for use with sunlight & concave with a focal distance of 10 to 14 inches if for artificial light. It may either be attached to the head of the surgeon, or fastened by an arm to a lamp. At first sight it might seem that a lamp with reflector & other requisites steadily fixed to it would be the most useful form of apparatus, but in practice it is not found convenient. eg. In making an examination you get as you suppose your light your patient & yourself all into proper position, make the patient open his mouth, introduce the mirror & find the angle at which the reflector is set is a little wrong. To get that right necessitates your withdrawing your instrument & then doing all your arranging over again, & this may be repeated till the patience both of yourself & patient is exhausted.

On the other hand with the reflector fastened to the head the slightest movement can correct defective position & that in time is done almost unconsciously. In this way also much more

freedom of movement for operating is given than with the fixed reflector. These advantages apart from convenience in carrying & preparing for use are quite enough to account for the general preference shown for the reflector on the head.

Czermak at first proposed to support the reflector by a plate of metal held between the teeth, but that method is objectionable for several reasons, not the least being that it makes it difficult for the surgeon to give directions to the patient during the ~~operation~~ examination.

The best means of supporting the reflector are undoubtedly the spectacle frame & the band round the forehead. The spectacle frame is very handy & quite efficient, but there is no doubt it annoys the eye to a certain extent, & it is less secure than the head band. It is also more expensive. With the headband the reflector can be worn either over the eye or the forehead, & in the latter position the eyes are left absolutely free. When the reflector is in front of the eye, the eye has the advantage of being in the line of the reflected light & therefore in the best position for seeing the illuminated part of the larynx.

As to the kind of light to be used the best is of course sunlight when it is to be had. The most suitable reflector for sunlight is a large flat one, but a concave one can also be used if the precaution is taken not to bring the rays to a focus in the pharynx. Failing sunlight any ordinarily bright light such as a common gas jet or a paraffin lamp will suffice for most purposes. Where anything further is requisite an Argand lamp leaves little to be desired & the cases in which more elaborate apparatus with bull's eye &c are really of use are very few.

So much for the instrument, & now for its 'practical application'.

In reading Morell Mackenzie on the Laryngoscope the one thing which becomes impressed on the mind is the extraordinary amount & complexity of machinery made use of in his practice, almost enough in fact to raise the thought that more than the mere examination & treatment of the patient is aimed at. Happily all this paraphernalia can be dispensed with, & with a laryngoscope a lamp, a three legged stool for himself & another for his patient the surgeon has all that is necessary.

The light should be placed just above the level of the patient's mouth a little behind him & to one side. After placing himself & his patient so that the light from the reflector falls on the patient's mouth, the surgeon has next to warm the laryngeal mirror sufficiently to prevent the moisture of the breath from depositing on its surface. This is sometimes done by dipping it into hot water, but when artificial light is used it is more convenient to heat it over the lamp. The best method is to hold the face of the mirror over the lamp. The surface at first becomes dimmed but clears again in a few seconds & whenever the cloud has cleared away the mirror is hot enough. To prevent its being used too hot the back should always be applied to the back of the hand before it is introduced into the mouth.

A first principle in examining with the laryngoscope is that you can never gain your object by force. If irritation & itching are caused by the introduction of the mirror the instrument must be at once withdrawn & the next trial made more carefully. Attempts to retain the instrument in the throat & hold the tongue forcibly are sure to end in failure.

Even if the parts were perfectly measurable a certain amount of practice would be required to enable one to see clearly into the cavity of the larynx. When the element of a greater or less degree of irritability is added the difficulty is immensely increased. Beginners generally find at least four out of every five throats so irritable that they can't bear the mirror & it is only as they become more accustomed to the work that throats become more amenable to handling.

It is of some importance to have yourself & your patient properly seated, the light reflected to the proper spot & the mirror heated all before asking the patient to open his mouth. If the patient is made to open his mouth & put out his tongue while you are adjusting your light & heating your mirror, you may find by the time you are ready that his endurance is already exhausted & your chance of getting a proper view of the larynx gone.

The next point is how to deal with the tongue. Depressing it with a spatula as is sometimes done is objectionable for several reasons. It is almost certain to produce retching, & it is very apt to press the tongue & with it the epi-

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glottis downwards & backwards, whereas the object aimed at is to bring the epiglottis upwards & forwards. The tongue should be caught by the surgeon's thumb & forefinger in a fold of handkerchief & held well upwards. If the point is drawn towards the chin the under surface is not only pained by being stretched over the lower teeth, but the back part rises so high in the mouth that the mirror can with difficulty be introduced over it. The higher the point of the tongue is held the more the posterior part becomes depressed & the greater the facility for introducing the laryngeal mirror. The forefinger should be placed below the tongue just above the level of the under teeth & that prevents the possibility of any painful stretching over them.

The mirror should then be carried backwards as close to the hard palate as possible, special care being taken to avoid touching the tongue. When the uvula is reached it should be pushed backwards & upwards till the edge of the mirror rests against the posterior wall of the pharynx. The root of the tongue & the epiglottis ^{are first seen} ~~then~~ ^{are first seen} the arytenoid cartilages & the posterior half of the larynx. The handle of the mirror

which has hitherto been depressed is then to be slightly raised & the rest of the larynx is brought into view.

The relation of the image in the mirror to the larynx itself requires some notice. Place an ordinary bed room looking glass with the reflecting surface looking downwards & forwards & making an angle of about 30° with the perpendicular & the relation between the reflecting surface of the glass & the upper surface of the stand will be exactly the same as that between the laryngeal mirror in situ & the larynx. Place an object on the stand & observe its image in the glass & you find that while the right side of the image corresponds to the right side of the object & the left to the left, the part of the object which is next you, appearing in the upper part of the glass seems the most distant & the most distant part seems nearest. In other words the image is reversed antero-posteriorly but not laterally. This is easily verified on the larynx & is generally understood, & yet in the New Sydenham Society's translation of Czermak on the laryngoscope the following sentence occurs. "It is understood that the objects reflected

"are reversed, & consequently the right vocal cord appears on the left side, in the same manner as the right hand of any person placed before a looking glass is found to be on the left side of the figure". The analogy here is as incorrect as the supposed fact there being no real reversal of the image in an ordinary looking glass. The right side of a man before a looking glass appears in the part of the glass opposite, & the only reversal is in relation to the imaginary man behind the glass.

When the larynx is seen during ordinary respiration the glottis is dilated & the vocal cords covered in great part by the false cords. To get a view of the vocal cords & also to ascertain if any paralysis is present it is necessary to make the patient pronounce some sound & so put the cords on the stretch & bring them together in the middle line. Should either be paralyzed it remains relaxed & does not advance to meet its fellow during phonation. The sounds generally used in this way are ah, eh, & ee the tension of the cords & their nearness to each other being least with the first & greatest with the last. The use of these sounds is valuable in another way. In many

cases when the ~~laryngoscope~~ laryngeal mirror
 is introduced as described above the epiglottis
 is found to be so drooping that no view of the larynx
 can be had. If the patient be in such a case di-
 rected to say ah the epiglottis is raised consider-
 ably & may allow a view. If that is not enough the
 sound eh will be found to raise it further &
 the sound ee further still. It is often useful to
 make the patient pronounce the three sounds
 after each other prolonging each considerably.
 With each act of phonation the larynx is drawn
 upwards, & all the more the higher the note, &
 that causes the raising of the epiglottis. Occasionally
 this movement is more extensive than usual & the
 larynx is well seen during the production of the
 sound ah, while the sound ee raises it till the tongue
 almost touches the roof of the mouth & blocks the
 view. Cases occur every now & then where either
 from extra thickness of tongue, extra drooping of
 epiglottis or the existence of an unusually
 small pharyngeal cavity a view can't be had in any
 of the ways mentioned. In most of such cases
 the surgeon may attain his object by holding the
 tip of the tongue unusually high & making the
 patient substitute for the usual prolonged sound

a short sudden ~~ex~~ which raises the epiglottis better. or he may come to the same thing if he ask the patient to pronounce the usual prolonged sound & then suddenly make a short rapid inspiration.

Instruments have been devised for hooking up the epiglottis in cases not otherwise accessible, & an ordinary urethral sound bent to a suitable angle has been recommended for the same purpose but neither kind of instrument is likely to be of much value.

A state of matters which more frequently than drooping epiglottis prevents satisfactory examination is extreme irritability on the part of the patient. The irritability of the patient's throat is no doubt often merely a measure of the awkwardness with which the laryngeal mirror is handled but apart from that cause a number of cases are unable to submit to examination. The imagination of some is so busy that they retch before the mirror has passed the line of the teeth. Cases of paralysis of the Cords & Cases of Chronic laryngitis seem as a rule capable of bearing examination well. On the other hand Cases of laryngeal phthisis, syphilitic ulcers & in fact all cases where there is much inflammation

are more sensitive & more difficult to examine. Some of these Cases can't bear the slightest contact of the mirror but can be seen pretty well by holding it free in the cavity of the pharynx. Others can bear contact with the uvula & soft palate but not with the pharyngeal wall. Hence some recommend that the mirror be always held free in the pharynx & in contact only with the uvula. It is however difficult in this way to keep the instrument perfectly at rest, & the slight movements which generally occur are more apt to produce irritation than the steady pressure against the posterior wall.

In Cases of any kind touching the root of the tongue with the mirror is sure to produce reflex symptoms & interfere with the examination.

The occurrence of Cases too sensitive to allow examination has raised the question as to how far means of diminishing the sensibility of the pharyngeal mucous membrane ~~which~~ are available. Bromide of Potassium has been much praised by some & found quite inert by others. Sucking ice has been found useful as has also the application of astringent

solutions in the form of spray. Whatever doubt there may be about the effect of these measures there is none as to the efficacy of more mechanical touching of the parts. After frequent examinations the mucous membrane of the throat becomes more tolerant of the mirror, & frequent manipulation of the parts with a sound is nearly always a preliminary to any operation on the larynx.

In most cases the surgeon only wishes to see the parts from the epiglottis & any epiglottic folds to the vocal cords but when he wishes to see further he has merely to let the patient continue his ordinary quiet breathing when the glottis remains widely opened & allows a view of the trachea & its rings.

Local Treatment of the larynx includes the application of medicaments in various forms, the use of electricity & operative measures.

In the application of medicaments the simplest & mildest form is inhalation of the vapour of volatile substances such as iodine, acetic acid, carbolic acid &c. The inhalation is generally given along with steam

from some such apparatus as Nelson's inhaler where hot water is put in the jug & the volatile substance to be inhaled is sprinkled on the sponge through which the steam is drawn.

Somewhat stronger than the application of vapour is the application in the form of spray. This method can be used either for volatile or non volatile substances & the spray can be given either cold or hot as desired. Alkaline solutions, astringent solutions, solution of perchloride of iron, solution of nitrate of silver & many others have been used in this way. Either an instrument like Adams inhaler in which the spray is produced by a current of steam, or one like Richardson's spray apparatus in which it is produced by a current of air may be used. This method is less easy of application than it seems, & if the patient merely opens his mouth & lets the spray blown in, the chances are that none of it reaches the larynx. With the inhalation of vapour the case is different as the vapour is drawn into the lungs with the breath. To insure proper application of the spray the patient should take hold of the tongue & keep it well protruded & at the same time draw deep breaths. The spray

must also be very fine & the nozzle of the apparatus not too near the patient's mouth, otherwise the spray is blown against the posterior wall of the pharynx & finds its way to the oesophagus instead of the larynx. Under the most favourable circumstances only a small proportion of the spray which passes the fauces reaches the larynx.

Medicated solutions constitute another form of local application to the larynx. Much the same substances are applied in this way as in spray but the effect is considerably stronger. Where the solution to be used is perfectly fluid perhaps the best way of applying it is by means of a laryngeal syringe of which one form is figured in *Richman's Surgery*. Most frequently however a brush or sponge is used & when the solution is viscid there is no alternative. The ordinary piece of bent whalebone for carrying the sponge is not good, the angle being such as to make entrance into the larynx very difficult. The best form of handle is a metallic one about the thickness of a No. 4 catheter & with a screw at the end for attaching a small sponge or brush. A convenient method of introducing the sponge into the larynx is to

pass the left forefinger round the root of the tongue on the right side, hook forward the epiglottis & then pass the sponge along the dorsal surface of the finger. A preferable plan is to introduce the sponge with the help of the laryngeal mirror, the mirror being held in the left hand & the handle of the sponge in the right. This method requires some care & practice but it is more certain than the other & less disagreeable both to patient & surgeon. When house-physician in G.R.S. I had a patient with laryngeal disease into whose larynx as I thought I daily introduced a sponge with a solution of nitrate of silver by the method of hooking up the epiglottis with the forefinger. Later experience however convinced me that I had been diligently treating the food woman's oesophagus - a circumstance which may or may not account for the fact that the laryngeal symptoms did not improve. In introducing the sponge with the help of the mirror a little trouble is caused at first by the antero-posterior inversion of the image but that is soon got over. ~~to~~

In applying solutions to the larynx the

+ one handle sewing for all

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effect is increased if the solution is viscid enough to adhere to the part for some time. Hence glycerine is a good vehicle when strong effect is desired.

Whether a brush or a sponge should be used is a matter of choice. A brush can be applied with greater accuracy, but where it is desired to touch the whole larynx probably the sponge is better. The reason for preferring a brush is the greater facility in cleaning it. There can be no doubt that in dispensary practice especially there must be considerable danger of communicating contagious diseases thru the use of imperfectly cleaned brushes & sponges. In fact a sponge once used for a patient with specific disease should never be applied to other patients again. In private practice it is an easy matter to have a separate brush or sponge for each patient.*

A fourth method of applying remedies to the larynx & one very much practised is the inflation of powder. Alum, tannin, nitrate of silver, lead & opium & many other substances are used & generally diluted with sugar of milk. It might be expected that the sudden inflation of an irritant powder into the larynx would excite

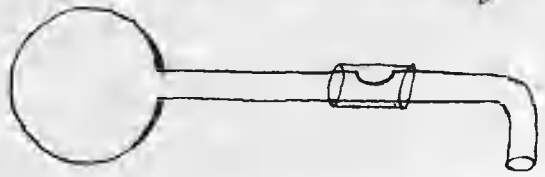
a paroxysm of coughing but such is not found to be the case. As a rule not more than a mere cough or two occurs. Trichem recommends for the application of powder a glass tube bent at nearly a right angle about an inch from the end. "The surgeon placing his finger over the orifice of the straight part of the tube carries the bent end behind the tongue over the epiglottis; he then directs the patient to make a sudden inspiration, & at the moment of his doing so, takes away his thumb so as to allow the powder to be drawn out of the tube & into the air-passages along with the current of inspired air." This method is certainly a very simple one, but as in inspiration the glottis is widely opened, the bulk of the powder would be more likely to be applied to the trachea than the larynx.

If it is desired to touch the vocal cords with the powder some other motive power than the current of inspired air must be had. The patient must be asked to pronounce some sound & while he is doing so & the cords are closing the floor of the larynx the powder should be blown in. Now & then cases occur where the sudden touching of the cords produces a short

spasm of the glottis enough to alarm the patient tho' rarely if ever really dangerous.

A tube such as is recommended by Brichsen forms part of all 'pulverisers' but the means for expelling the powder are various. Perhaps the best is that adopted in Schmitzler's pulveriser viz a small india rubber balloon at the end of the long arm of the tube.

The instrument is roughly represented opposite.



The opening on the upper surface of the tube with sliding cover is for introduction of powder. The pulveriser being charged & the patient having hold of the tongue, the surgeon places the laryngeal mirror as for ordinary examination, with the other hand introduces the pulveriser till the point is seen in the mirror to be directly over the larynx, then presses the balloon with the thumb & withdraws both instruments. Unfortunately the pressure with the thumb is apt to displace the point of the instrument & make the powder miss the larynx. This may be prevented by drawing the instrument back till the curved part rests on the epiglottis before pressing the balloon, but the procedure is liable to cause retching.

Another mode of expelling the powder is to substitute for the balloon of Schmitzler's apparatus an india rubber tube thro which the surgeon blows the powder into the patient's larynx. This gives a steadier instrument but the process is a somewhat disagreeable one to the patient not to speak of the possibility of an untimely cough on his part blowing the powder into the wrong larynx.

The application of remedies to the throat in the form of powder is easier & less disagreeable to the patient than applying solutions with a brush or sponge, but it is doubtful whether the results are as satisfactory. In chronic laryngitis the application is generally too weak, & the instances in which I have seen most benefit from it were cases of laryngeal phthisis where diluted lead & opium powder was applied.

Remedies to the larynx applied in the solid form are chiefly caustics for burning small growths or the roots of larger ones after the bulk has been removed. For applying these the use of a holder carrying a piece of caustic is objectionable on account of the dangers which would be incurred in case of

the Caustic dropping out. Hence a little Caustic is generally melted on the ~~end~~ of a Cornrod & so introduced. Cornrods with a double curve to keep the hand of the operator, ^{better} out of the way are sometimes used. They have however little advantage over the single curve ones are but easily handled, & require to be made right & left according to the side to be operated upon.

To prevent the possibility of touching the mouth or pharynx with the Caustic during introduction some use a covered Caustic Carrier of which the Caustic carrying point can be protruded when the spot to be acted on is reached. Theoretically this is an improvement but it is found troublesome in practice the Caustic in particular being very liable to be knocked off before it reaches its destination. In general it is not found that the application of Caustics is followed by much pain.

The application of Electricity to diseases of the larynx is not very extended but in certain classes of cases nothing gives so brilliant results. A young woman for example presents herself with the complaint that her voice disappeared so many weeks or months ago & that she has not been able to speak above a

whisper since. Examination shows that the vocal Cords are normal in structure or only slightly congested, that they move freely enough, but that when the patient attempts to speak they are not put properly on the stretch & don't come sufficiently close together in the middle line. In such cases a single application of the poles of a battery to the skin at the sides of the larynx will generally restore the voice for a time & a few applications will produce a permanent cure.

In bilateral paralysis of the Cords following diphtheria or without apparent cause the results of treatment by electricity are very variable & often very disappointing. Cases of unilateral paralysis are generally due to pressure on the recurrent laryngeal nerve by aneurism of the aorta, enlarged bronchial glands or other tumour, & hence are not to be affected by any treatment applied to the larynx.

Where application outside the larynx fails one pole of the battery may often be applied to the inside with good result. A further refinement has also been tried in the form of an instrument to carry both poles inside the larynx & electrify the individual muscles, but that this will be

of much practical value is improbable.

In the galvano-cautery we have a mode of application of electricity in throat practice which is likely to come into more general use possessing as it does the advantages of being a most powerful means & one very readily controlled. The instrument to be used in the larynx is curved like a laryngoscope sound the centerizing part being a small loop of wire exposed at the end while the current is connected or broken by a spring to be pressed by the forefinger.

After being connected with the battery the instrument is introduced with the help of the mirror like an ordinary sound; the spring is then pressed ~~with~~ by the forefinger when the loop of wire becomes instantly heated & is applied to the required spot for a few seconds. The forefinger is then removed from the spring & the instrument withdrawn.

In cases of chronic thickening from old laryngitis I have seen the larynx notched all round with the cautery & the patient so little disturbed by the process that he submitted to repeated laryngoscopic examinations immediately after apparently without more than the usual discomfort.

More or less inflammation with swelling may of course follow the application & if it involved the glottis might even compel recourse to laryngotomy.

Operative measures for the removal of polypii from the larynx are very various according to the position size & firmness of the growth. Where the growth is from the side & projects horizontally it may often be very readily removed by a small laryngeal guillotine. In other cases the base may be cut across with a laryngeal lancet; many can be torn away very easily with forceps while others too firm to yield even to strong force have been found to atrophy & come away after forcible crushing of the base. The smaller sessile growths may be removed by caustics & probably the galvanic cautery will be found a valuable means in many cases.

Clarification of the larynx is an operation occasionally required for oedema of the submucous areolar tissue. Where the oedema is situated in the epiglottis & ary epiglottic folds the operation may be done with a ~~curved~~ curved probe pointed bistoury of which all the cutting edge is covered except a small part at the point. The tongue being well protruded the knife is to be carried to the back of the pharynx & the swollen tissues incised from behind forwards. If the oedema is more deeply placed a laryngeal base

guided by the mirror must be used.

For obstruction of the larynx sufficient to interfere with respiration the great remedy is of course an artificial opening below the obstruction i.e. either tracheotomy or laryngotomy. Where the cause of obstruction is a temporary one the artificial ^{opening} is allowed to close after it disappears & a perfect cure results, but when the obstruction is permanent unless further measures are taken, the operation becomes a mere palliative one. The following case for example is one of a kind often met with:- B.R. age 61 was admitted into E.R. about Xmas. 73 with symptoms of laryngostenosis of 18 months duration. The laryngoscope showed the larynx much thickened, the vocal cords thick, red, immovable, partly joined together & with only a small roundish aperture between. Treatment seemed to relieve him for a time but an exacerbation occurred with extreme dyspnoea & he was livid & semicomatose when relieved by tracheotomy. After the operation a 30 grain to the ounce solution of nitrate of silver was applied daily to the larynx with a view to promote absorption of the excessive material, but tho' the parts became looser & softer, they continued to lie in contact, the inability to breathe

by the natural passage remained as complete as ever & in the autumn of '74 he was still breathing thro the artificial opening.

Such cases have generally been compelled to wear the tracheal tube to the end of their days, but by means of bougies the natural passage can be dilated & the need of the artificial opening overcome. To allow the carrying out of this after treatment laryngotomy should be performed in preference to tracheotomy. The bougies used are about $1\frac{1}{2}$ inch long with a little knob at the lower end & of thickness varying from that of a quill to that of the forefinger.

Carried by a suitable handle & guided by the laryngoscope the bougie is pushed down thro the larynx till the knob becomes visible in the tube at the artificial opening where it is fastened by a small clamp. The handle is then removed & a thread left attached to the upper part of the bougie & hanging from the mouth to facilitate removal. The size of the bougies is gradually increased till one about the thickness of the forefinger can be passed, by which time the patient has ample space for respiration tho his power of speaking may be small.

It is surprising how slight a degree of contraction

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This free handling of the larynx produces. When the bougie was to be kept in only about fifteen minutes I have seen the handle left attached for that time & projecting from the mouth, & yet the patient walked about without showing any symptoms of distress.

The liberties which this treatment shows may be taken with the larynx raise the question whether it might not be possible to accomplish gradual dilatation in suitable cases without an artificial opening at all. Something approaching to this has already been successfully tried in the treatment of Croup, the instrument used being a rigid tube about the thickness of a medium sized catheter & bent at nearly a right angle about three inches from the end. In cases where symptoms of asphyxia & Carbonic acid poisoning were coming on the passing of such an instrument thro' the larynx has been followed by speedy restoration of the oxidation of the blood, while its withdrawal has sometimes brought away the false membrane & given permanent relief. If this can be done in Croup there seems no reason why it should not be possible in threatened obstruction from Chronic Laryngitis, & if the instrument could be passed at intervals & allowed to remain

for a short time the analogy of urethral & lachrymal strictures would justify our expecting the effused matter to be absorbed & the obstruction removed.